

**REMARKS/ARGUMENTS**

This amendment is submitted in response to the Office Action dated September 6, 2006. Reconsideration and allowance is requested.

Claims 1, 3-17, 19-41 remain in this application. Claims 2 and 18 have been canceled by this amendment. Claims 39-41 are new claims add by this amendment.

Claims 30-38

The Office Action Summary page shows that claims 1-38 are pending and that claims 1-38 are rejected. However the detailed action portion of the Office Action did not address the patentability of claims 30-38. The Applicant respectfully requests that the Examiner either provide a reason why claims 30-38 are not allowable or allow the claims after examination. Moreover, the Applicant believes that claims 30-38 are patentable over the prior art used by the Examiner to reject claims 1-29 for at least the same reasons presented below to counter-argue the Examiner's rejection of claims 1-29.

***Claim Rejection under 35 USC 102***

In the Office Action, claims 1- [sic] were rejected under 35 USC 102(b), as being anticipated by Higgins III (U.S. Patent 5,639,989). "Under 35 USC § 102, anticipation requires that each and every element of the claimed invention be disclosed in a prior art reference..." *Akzo v N.V. v. U.S. Int'l Trade Comm'n*, 808 F.2d 1471, 1 USPQ2d 1241 (Fed. Cir. 1986) cert. denied, 482 U.S. 909 (1987).

Claims 1 and 15

Although the Applicant does not agree that either claim 1 or 15 is anticipated by Higgins III, in order to expedite prosecution claims 1 and 15 have been amended to incorporate the limitations of claims 2 and 18, respectively. Specifically, claim 1 recites a "shielded printed circuit board (PCB) comprising...an electronic component mounted to the first surface of the PCB; wherein adjacent conductive vias are spaced within the PCB a distance that is small

enough to reduce a passage of electromagnetic radiation from the electronic component through the spacing between the adjacent conductive vias." The Applicant believes that currently amended claims 1 and 15, which were previously claims 2 and 18, respectively, are not anticipated by Higgins III because each and every element of the claims is not disclosed in Higgins III.

The Applicant believes that Higgins III does not teach each and every element of currently amended claims 1 (previous claim 2) for at least the reason that Higgins III does not teach, disclose or suggest "adjacent conductive vias are spaced within the PCB a distance that is small enough to reduce a passage of electromagnetic radiation from the electronic component through the spacing between the adjacent conductive vias," as claimed. The Examiner rejected claims 2 and 18 by arguing:

With respect to claims 2 and 18 with all of the limitations of claims 1 and 15 respectively, Higgins teaches comprising an electronic component (Fig. 1, element 13) mounted to the first surface of the PCB, wherein adjacent conductive vias are spaced within the PCB a distance that is small enough to reduce a passage of electromagnetic radiation from the electronic component through the spacing between the adjacent conductive vias (Note this true because of the EMI ground layer, the spacing is sufficiently small along with the EMI ground layer to reduce passage of electromagnetic radiation).

The Examiner has not shown where Higgins III teaches the vias, as claimed. Additionally, it appears that the Examiner has simply concluded that because Higgins III teaches an EMI ground layer and a vias, then the spacing of the vias is sufficiently small along with the EMI ground layer to reduce passage of electromagnetic radiation. The Applicant respectfully submits that the Examiner has misinterpreted the teachings of Higgins III because FIG. 1 clearly shows that the through holes 20, which the Examiner has interpreted to be the vias, are located to the side of both the die 13 and the EMI ground plane 27. Since the vias 20 are located to the side of the die and clearly not in between the die 13 and the EMI ground plane 27, it is unclear why the spacing between Higgins' vias would have any effect on the passage of radiation from the electronic component to the conductive vias. A careful review of Higgins' Fig. 1 shows that the

only elements between the die 13 and the EMI ground plane 27 are a power plane 25, internal signal layers 22 and 23, conductive pads 18, and solder balls 14. Since the vias 20 are clearly located to the side of both the die 13 and ground plane 27, it is unlikely that Higgins III vias are positioned such that "adjacent conductive vias are spaced within the PCB a distance that is small enough to reduce a passage of electromagnetic radiation from the electronic component through the spacing between the adjacent conductive vias." Moreover there is nothing in Higgins III which discusses the spacing of the vias. Thus the Applicant respectfully submits that Higgins III does not teach each and every element of currently amended claims 1 and 15 (previous claim 2 and 18 respectfully). Therefore, claims 1 and 15 are not anticipated under *Akzo*.

#### Claim 4

In rejecting claim 4 the Examiner argued that "Higgins teaches that the metallized polymer shield is removably coupled to the first surface of the PCB (Fig. 1)." The Applicant respectfully traverses. Claim 4 depends from claim 1 and incorporates all of its limitations. For at least the same reasons as discussed above with respect to claim 1, claim 4 is also patentable over Higgins III.

Additionally, the Applicant believes that Higgins III fails to teach the metallized polymer shield is removably coupled to the first surface of the PCB. In column 6 lines 18-23, Higgins III teaches that the insulating coating 24 is dispensed and cured over the die. Such a coating is not removably coupled to the PCB but instead is permanently coupled to the PCB. In fact Higgins explains the permanency of coating 24 in column 6 lines 40-43 where he describes that "it may be necessary to remove the coating 24 from such regions through photolithographic, laser processing, mechanical ablation, or other means." Clearly the techniques described by Higgins for removing coating 24 are destructive. One skilled in the art would not interpret a coating that is removed by destroying it to be removably coupled. Thus, Higgins III teaches dispensing a coating onto the die that is permanent instead of removable. Therefore, Higgins III fails to teach the metallized polymer shield is removably coupled to the first surface of the PCB, as claimed.

Claims 6 and 21

In rejecting claims 6 and 21 the Examiner argued that "Higgins teaches that the conductive elements comprise a conductive adhesive (Fig. 1, element 19)." The Applicant respectfully traverses. Claims 6 and 21 depend from claims 1 and 15 respectively and incorporate all of their respective limitations. For at least the same reasons as discussed above with respect to claims 1 and 15, claims 6 and 21 are also patentable over Higgins III.

Additionally, the Applicant believes that Higgins III fails to teach that the conductive elements comprise a conductive adhesive. Higgins III clearly teaches that element 19 is a ground ring and not an adhesive. Although it is not clear how the ground ring is attached to the vias, there is nothing to suggest that the ground ring is an adhesive that couples the metallized polymer to the vias. In column 5 lines 58-62, Higgins III describes the ground ring as:

For instance, as illustrated in FIG. 1, EMI ground ring 19 is connected to the EMI ground layer 27 by through-hole 20. Conductive traces or pad 18 are connected to appropriate internal signal layers 22 and 23 or power plane 25.

Therefore the Applicant believes that Higgins III fails to teach that the conductive elements comprise a conductive adhesive, as claimed.

Claims 7 and 20

In rejecting claims 7 and 20 the Examiner argued that "Higgins teaches that the metallized polymer shield is coupled to the vias through a mechanical connector (Fig. 1, the land portion of the via 20)." The Applicant respectfully traverses. Claims 7 and 20 depend from claims 1 and 15 respectively and incorporate all of their respective limitations. For at least the same reasons as discussed above with respect to claims 1 and 15, claims 7 and 20 are also patentable over Higgins III.

Additionally, the Applicant believes that Higgins III fails to teach that the metallized polymer shield is coupled to the vias through a mechanical connector (Fig. 1, the land portion of the via 20). Although Fig. 1 does appear to show that the vias contains land portions,

the function of these land portions, if there is any, is not clear. There is no reason to conclude that the land portions provide the mechanical connection claimed. The Applicant respectfully requests that the Examiner provide a reason why these land portions are the mechanical connectors claimed.

Claim 9

Claim 9 was rejected because "Higgins teaches that the second surface is an external, bottom surface of the PCB (note the ground plane coupled to the bottom surface)." Clearly the grounded layer is not coupled to the second surface of the PCB. If the Examiner interprets die 13 to be the PCB and the first surface of the PCB to be coupled to the shield then the second surface of the PCB is coupled to the conformal insulating layer 24, or the solder balls 14 or the underfill material 15, but not the EMI ground plane 27. Therefore, Higgins does not teach that the grounded layer is coupled to the second surface of the PCB, as claimed. Additionally, because claim 9 depends from claim 1 and claim 9 is patentably distinct over Higgins for the reasons discussed above, claim 9 is also patentable over Higgins for those same reasons.

Claims 3, 5, 8, 10-11, 14, 16-17, 22, 25-29

Claims 3, 5, 8, 10-11, 14, 16-17, 22, 25-29 depend from claims 1 and 15 respectively and incorporate all of their respective limitations. For at least the same reasons as discussed above with respect to claims 1 and 15, claims 3, 5, 8, 10-11, 14, 16-17, 22, 25-29 are also patentable over Higgins III.

***Claim Rejection under 35 USC 103***

In the Office Action, the Examiner rejected claims 12-13, and 23-24 under 35 USC 103(a), as being unpatentable over Higgins III. The Applicant respectfully traverses. In order to establish *prima facie* obviousness three basic criteria must be met. First, there must be some suggestion or motivation either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art references (or references when combined) must teach or suggest all of the claimed limitations. The teachings or suggestions to make the claimed invention and the reasonable expectation of success must be found in the prior art and not based on Applicant's disclosure. See *In re Vaeck* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and MPEP 2143. The Applicant respectfully submits that the Examiner has not satisfied all three criteria outlined in MPEP 2143.

Claims 12-13, and 23-24

Claims 12-13, and 23-24 depend from claims 1 and 15 respectively and incorporate all of their respective limitations. For at least the same reasons as discussed above with respect to claims 1 and 15, claims 12-13 and 23-24 do not teach or suggest all of the claimed limitations.

Additionally, claim 12 recites that the "metallized polymer shield comprises a shaped polymer substrate that provides a cavity that is sized and shaped to receive the electronic component, wherein the shaped polymer substrate comprises a flange that extends around at least a portion of a perimeter of the cavity in a direction that is substantially parallel to the first surface of the PCB; and a metal layer disposed over at least one surface of the shaped polymer substrate." Higgins III fails to teach a shaped polymer substrate that provides a cavity. Instead Higgins III teaches that the polymer shield is deposited directly onto the die. Specifically, in column 6 lines 18-23 Higgins III teaches:

In accordance with the present invention, after die 13 is properly attached to substrate 16 and the appropriate electrical connections to the substrate are made, a conformal insulative layer or coating 24 is dispensed and cured over the die and other regions of substrate 16 which will be shielded to prevent emission or coupling of EMI. Coating 24 is applied directly on the die and portions of the substrate to prevent electrical short circuiting to a subsequently deposited conductive layer(s).

Also claim 23 recites that the shield comprises a metal can. Higgins III clearly fails to teach a metal can because the shield is deposited over the die. A deposited shield is not a metal can.

#### Claim 19

In the Office Action, the Examiner rejected claim 19 under 35 USC 103(a), as being unpatentable over Higgins III in view of Kaneko (US Patent 6476463). The Examiner acknowledged that Higgins "does not specifically teach that the largest dimension is smaller than half a wavelength of EMI emissions from the electronic component. Kaneko teaches vias that are separated by certain dimension wherein the largest dimension is smaller than half a wavelength of EMI emissions from the electronic component (column 5, lines 13-17). It would have been obvious to one of ordinary skill in the art at the time of the invention to have the largest dimension separating vias to be smaller than half a wavelength of EMI emissions from the electronic component, for the purpose of quickly attenuating the EMI emissions." Although Kaneko does teach spacing apart the through holes 6 at an interval that is sufficiently small compared to one half the wavelength of an electromagnetic wave guided by the waveguide, one skilled in the art would not have been motivated to modify Higgins to use Kaneko to make the claimed invention. The claimed invention adjusts the spaces between adjacent conductive elements to be the largest dimension that is small enough to substantially reduce emission of electromagnetic radiation from the electronic component. Clearly, Kaneko is adjusting the spacing to prevent energy loss in the waveguide and not to reduce emission of electromagnetic radiation from the electronic component.

Additionally, claim 19 depends from claim 15 and incorporates all of its respective limitations. For at least the same reasons discussed above with respect to claim 15, claim 19 does not teach or suggest all of the claimed limitations.

#### *New Claims*

Claims 39-41 are new claims added by this amendment. New Claims 39-41 recite that at least one of the plurality of the vias is located below the PCB. Support for these

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amendments can be found throughout the originally filed specification including FIG. 2 and paragraphs [0075]-[0086]. The Applicant believes that neither Higgins III nor Kaneko discloses these limitations.

### CONCLUSION

In view of the foregoing, Applicant believes all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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